



Southern Company Transmission

SUPERHYDROPHOBIC COATING FOR POLYMER INSULATORS DEVELOPED BY NEETRAC / GEORGIA TECH

MISSISSIPPI CHEMICAL – MOSS POINT EAST 115 KV T.L.

IEEE Insulators WG

7/22/2008

Jack Varner – Southern Company

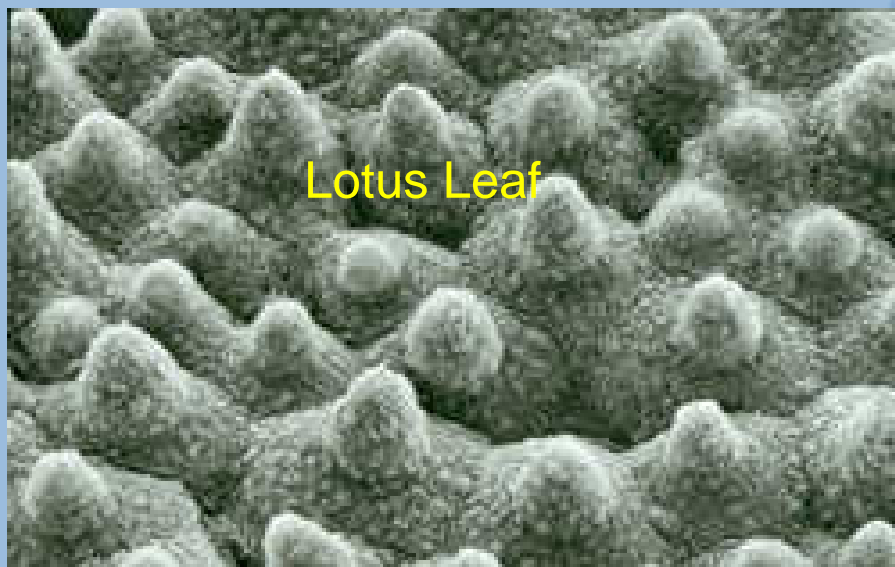
Frank Lambert – NEETRAC



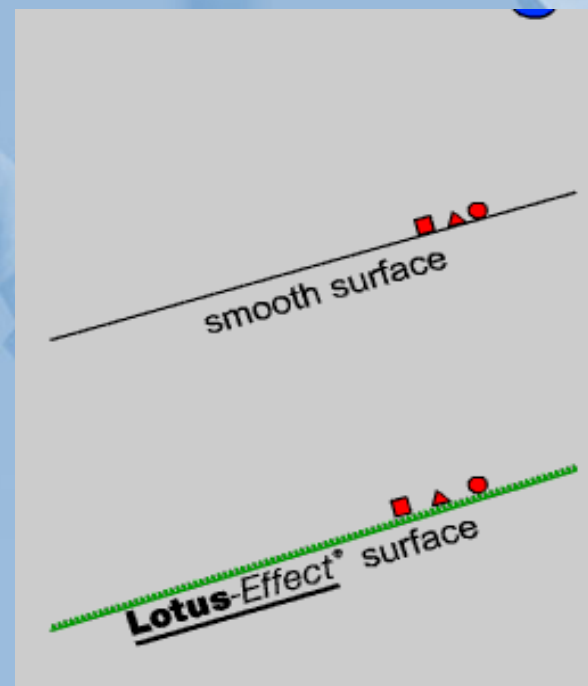


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Lotus Effect Surface



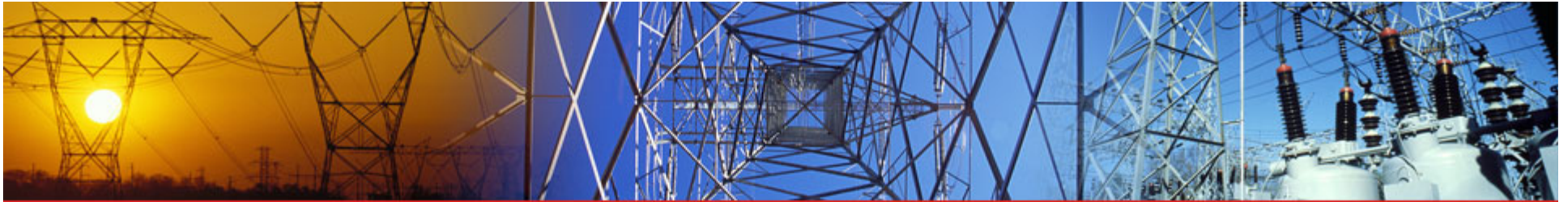
Lotus Leaf



Lotus Effect Surfaces:

Avoid water sheeting – drops stay as drops

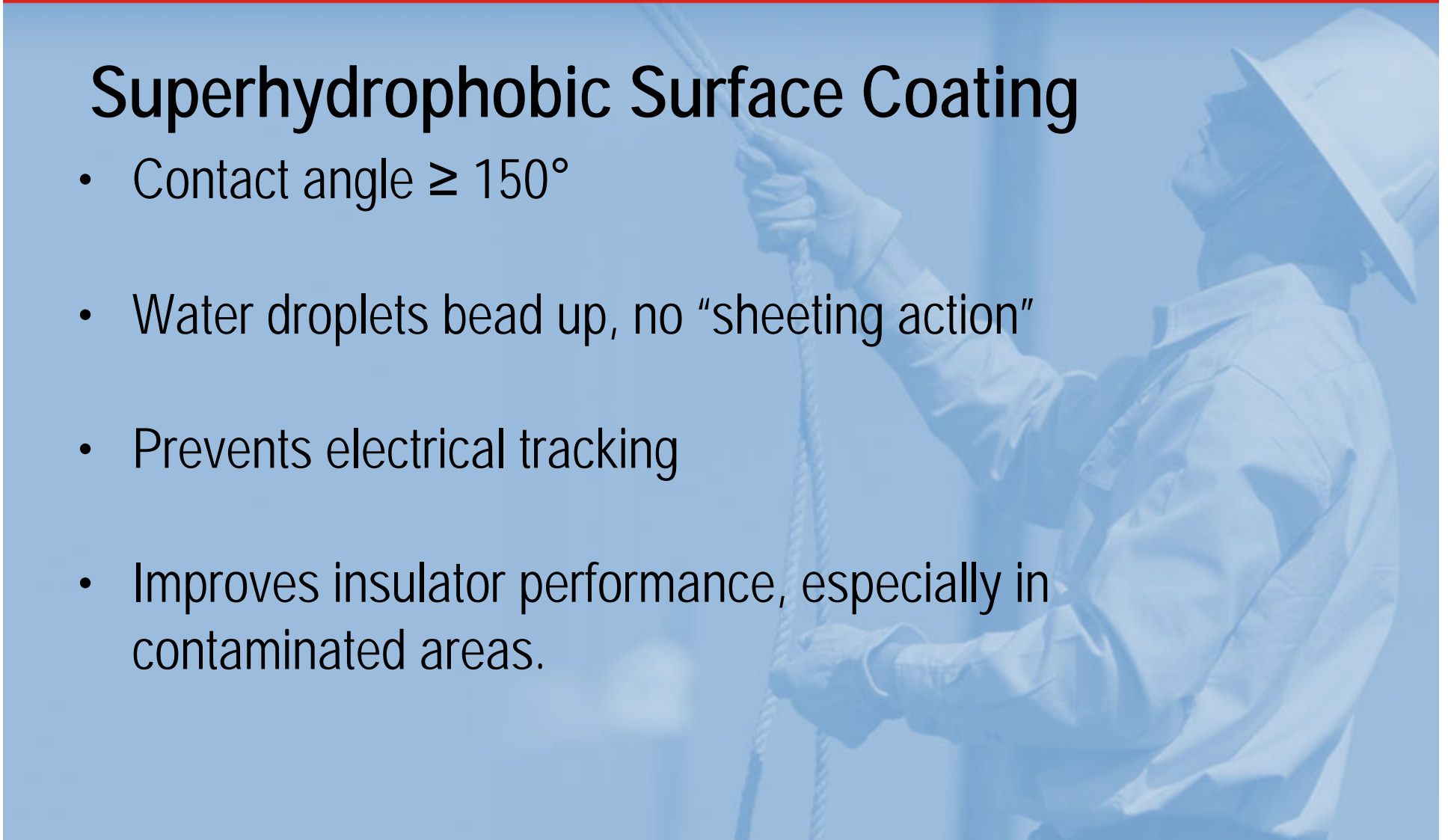
Self Cleaning – remove dust / contamination



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Superhydrophobic Surface Coating

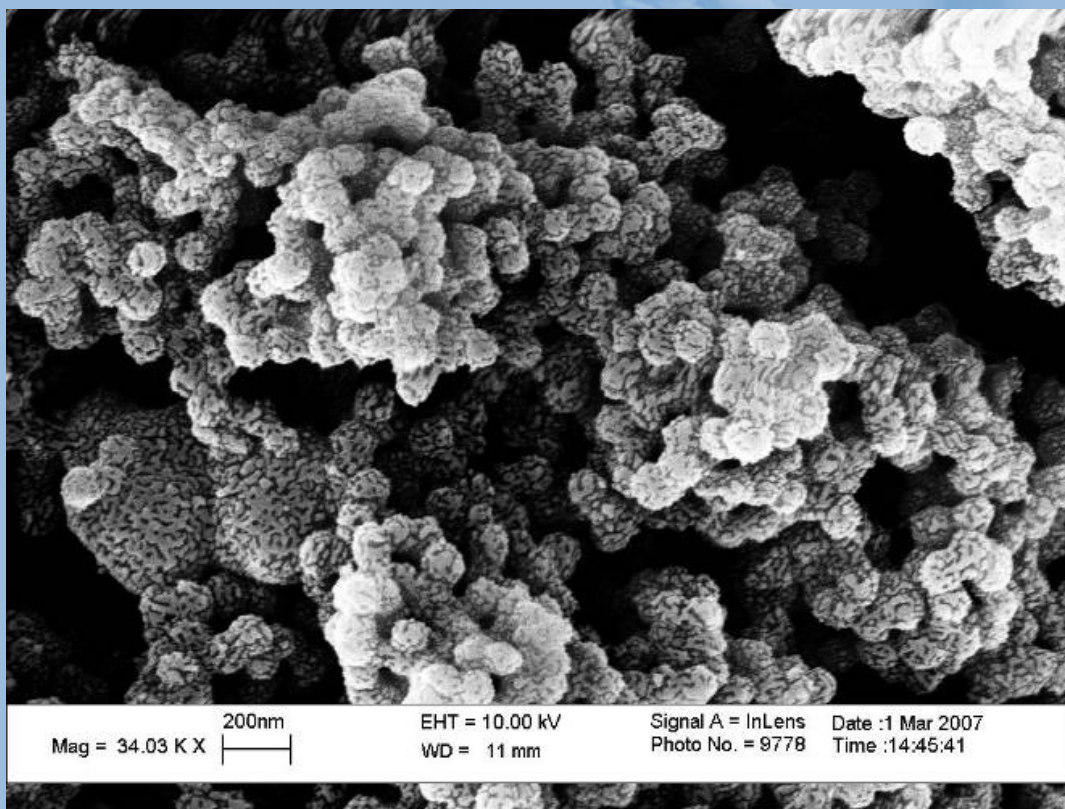
- Contact angle $\geq 150^\circ$
- Water droplets bead up, no “sheeting action”
- Prevents electrical tracking
- Improves insulator performance, especially in contaminated areas.





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Lotus Effect Surface for Insulators Developed by Georgia Tech / NEETRAC

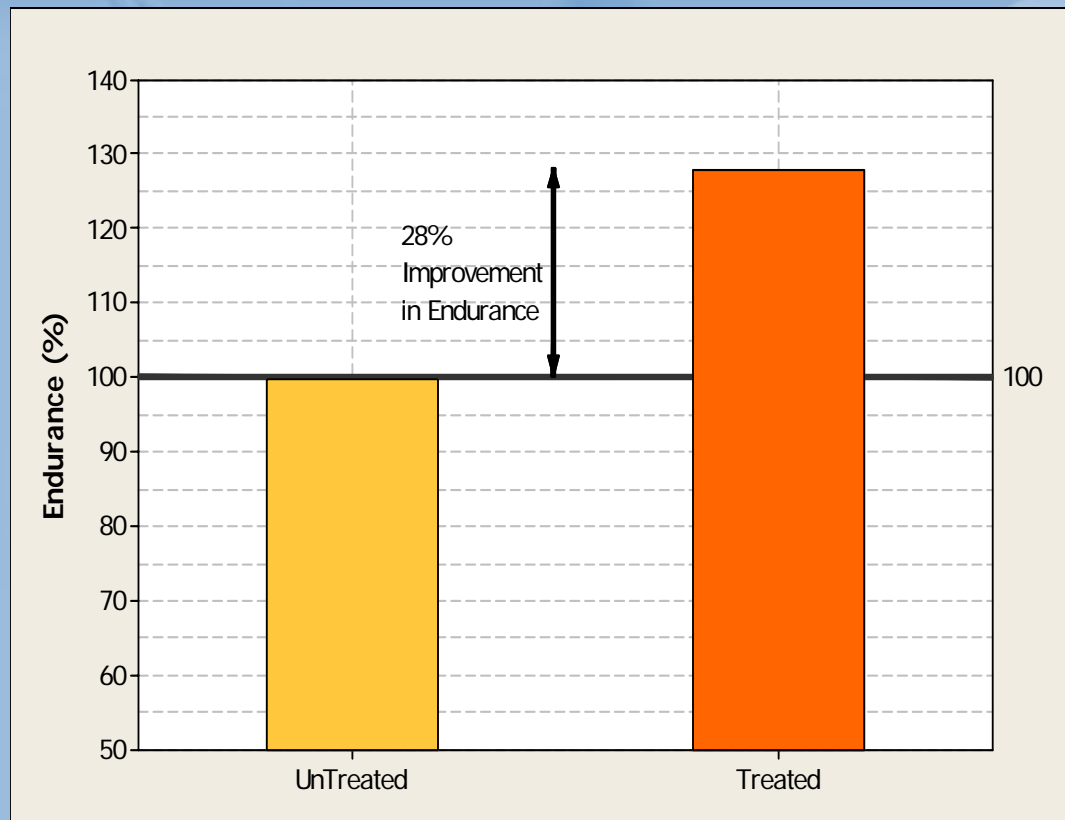


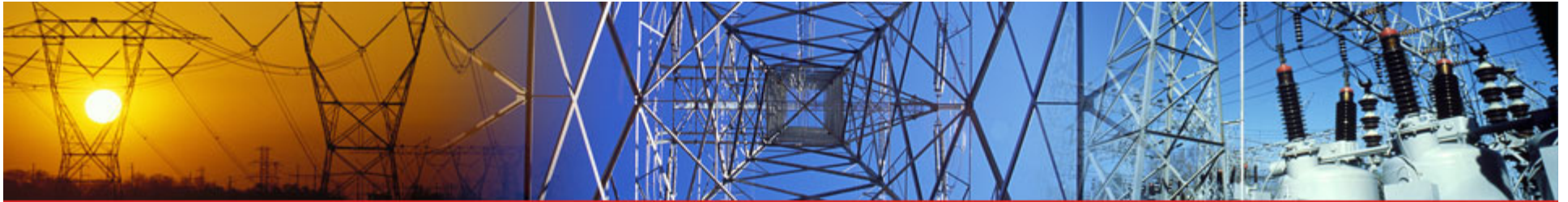


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Lab Results

- Works on all polymer insulations
- Lasts at least 2000 hours in energized salt fog testing
- Increases the endurance in accelerated tests

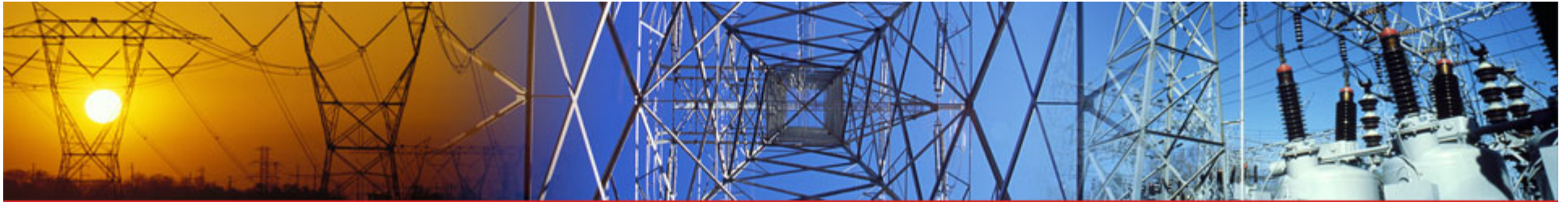




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SUPERHYDROPHOBIC COATING

- Gives insulators superior performance in contaminated environments.
- Coating can be applied in several ways:
 - Sprayed on in field
 - Painted on with brush in field
 - Can be dipped in solution
- Treatment can also be applied to glass and porcelain insulators, but they must be pre-treated to ensure the solution adheres to the surface.
- Both US and Foreign Patents Filed.



Field Test Participants

- Ohio Brass Polymer Silicone Insulators
- Southern Company Transmission Lines
- Test Site at Mississippi Power
- Miss. Chemical – Moss Point 115kv line



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Insulator
Installation
Site



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STR#: 54

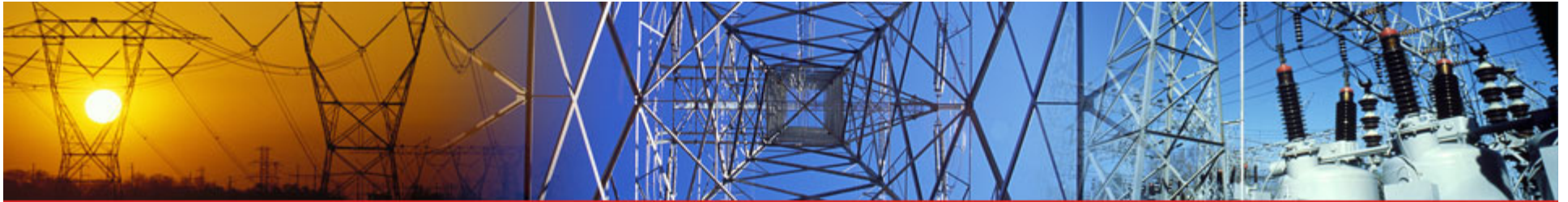
Wooden H-Frame

STR#: 55

Wooden H-Frame

STR#: 56

Wooden 3PDDE



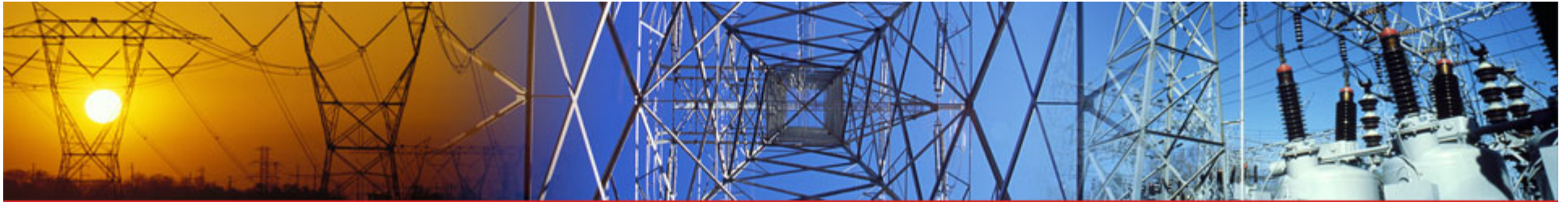
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STR# 54

- Replaced three Suspension Insulators installed in 2005 with three new Polymer Suspension Insulators.
- Insulators were new and NOT Coated with the new solution.

STR #55

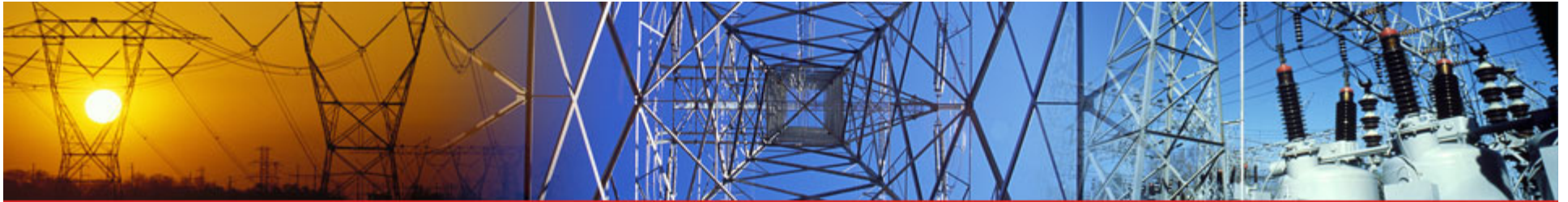
- Replaced three Suspension Insulators installed in 2005 with three new Polymer Suspension Insulators.
- Insulators were treated with the new coating solution.



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Superhydrophobic solution applied to the new Quadri*sil™ Insulators





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Superhydrophobic solution on new Quadri*sil™ Insulator





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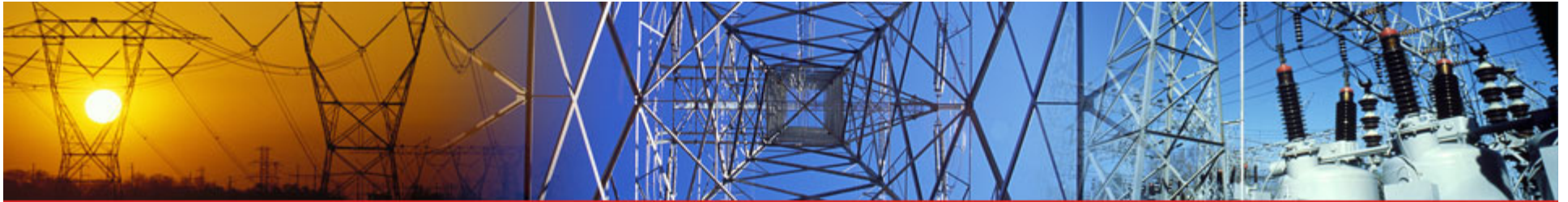
Installing new uncoated Insulator at Str.# 54



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Severe Pin Corrosion was found on all of the Porcelain Insulators which were removed. These insulators had been in service approximately three years.

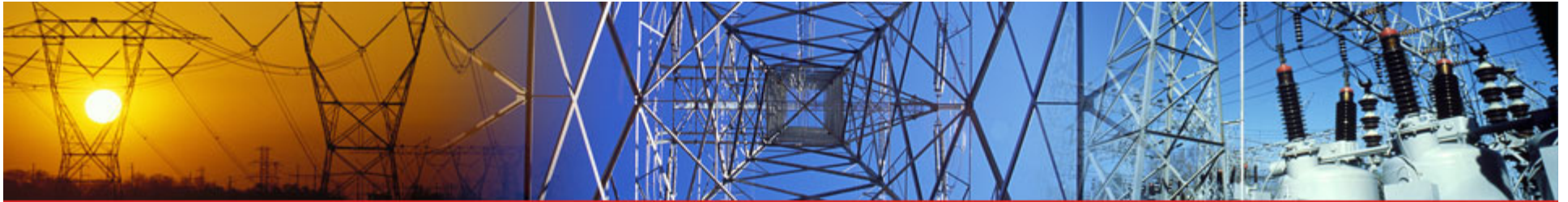




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This guy grip had been in service for six weeks. Notice that the loop that wraps around the anchor attachment point has corroded out of the guy grip.

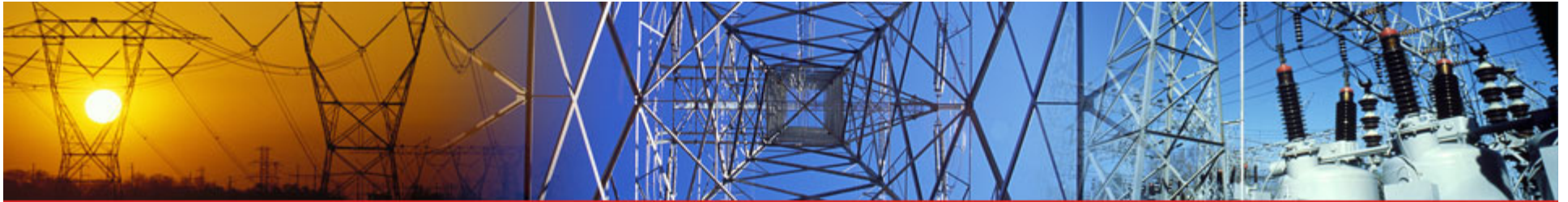




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This guy wire had been in service for six weeks. Notice that the individual strands have necked down much like you would expect to see from a tensile failure.





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